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Les documents fixés à cette attestation sont conformes à la version initialement déposée de la demande de brevet européen spécifiée à la page suivante.

Patentanmeldung Nr. Patent application No. Demande de brevet n°

98250315.3

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Blatt 2 der Bescheinigung
Sheet 2 of the certificate
Page 2 de l'attestation

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DEUTSCHE THOMSON-BRANDT GMBH
78048 Villingen-Schwenningen
GERMANY

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1 Introduction of Stream Recording Format

1.1 Purpose of the Specification

This DVD Stream Recording Specification is defined to use rewritable DVD discs for recording existing digital bitstreams, editing them and playing them back as bitstreams. The Specification is designed to satisfy the following requirements:

1.1.1 Service Requirements

1.1.1.1 Individual Packet Size Support

Any packet size should be supported as long as it is less than 2kByte and of constant length within a take.

1.1.1.2 Timing Regeneration

A timing mechanism (time stamp) needs to be added to every broadcast packet to enable proper packet delivery during playback.

1.1.1.3 Non-real-time recording/download

To enlarge the fields of applications, non-real-time recording should be possible. However, in this case the STB has to generate the Time Stamp information.

1.1.1.4 Data allocation strategy

Data allocation strategy and file system need to be designed to support real-time stream recording. The solution, which will be specified in the RTRW activity, should be studied and adopted as close as possible.

1.1.1.5 TOC and Service Information Support

Many digital services require Service Information which normally is embedded in the real-time stream. To support the STB, DVD should provide additional space, which can be used by the STB to duplicate part of the service information and to add additional TOC information.

1.1.1.6 Copy Protection Support

The Copy Protection rules are discussed in CPTWG and WG9. These rules must be supported. In addition any scrambling performed by the service provider or the STB must be kept unchanged. In a later stage some joint discussion with SW owners and service providers might be needed.

1.1.2 User Requirements

User requirements can be grouped into requirements for recording, requirements for playback, and requirements for editing.

(Requirements for Recording)

1.1.2.1 Real-time Recording

The format should be designed to enable real-time recording of digital streams. It also should allow the user to concatenate recordings, even if those recordings consist of

different stream formats. If recordings are concatenated, a (close to) seamless playback possibility would be nice but is not required.

1.1.2.2 Total Recording Time

Regarding the recording time, the conditions are very similar to the RTRW scenario. Therefore the same rules should be valid. In any case the user must be able to understand the situation and to take appropriate action, if needed.

1.1.2.3 Navigation Support

To support navigation two pieces of information (lists) should be generated during recording.
An 'original' version of a play list. This list contains quite low level information, e.g. time map or (broadcast) packet order of the recording. This list is accessible by the STB and the content is understood by the DVD streamer as well as by the STB. In its 'original' version the playlist enables the playback of a complete recording. The playlist may be accessed and extended after recording by the STB to allow more sophisticated playback sequences.
The second piece of information, mapping list, is generated to support the stream recorder to retrieve packet stream chunks (cells), that are described in terms of the application domain (e.g. 'broadcast packets' or 'time'). This list is owned and understood by the DVD streamer only.

1.1.2.4 Content Description

The format should reserve space, which can be used by the STB to store high level TOC and Service Information. This information is provided for the user to navigate through the content stored on disc and may contain sophisticated GUI information. The content is not needed to be understood by the stream recorder. However a common subset of the TOC information, e.g. based on a character string, may be useful to be shared between STB and DVD, in order to enable the stream recorder to provide a basic menu by itself. This may require some joint discussion with STB manufacturers.

(Requirements for Playback)

1.1.2.5 Playback of individual recordings

Needs to be supported; should be possible via play list.

1.1.2.6 Playing all recordings sequentially

This is basically a set matter; should be possible via playlist.

1.1.2.7 Player menus for entry point selection

This is mainly STB's responsibility, which can generate a sophisticated menu based on the TOC information stored on the disc. However, it should be possible to generate a simple menu by the streamer itself, e.g. via some 'character' information which is shared by STB and DVD.

1.1.2.8 Trick play modes

The STB should be able to steer trick play via the 'play list'. Due to the nature of the broadcast stream, the trick play features may be limited to basic ones, e.g. Time Search and Title Jump.

1.1.2.9 User defined PB sequences

Features like playback programming or parental control can be supported via the play list

1.1.2.10 Play list support

The playlist must be supported as a key for all special playback and navigation.

1.1.2.11 Play list creation

The DVD streamer should create the 'original version' of the play list. It also should allow extensions and modifications of the play list by the STB for more sophisticated playback features. The DVD streamer is not responsible for the content of those sophisticated playlist(s).

(Requirements for Editing)

1.1.2.12 Delete single recordings

The format must support the deletion of single recordings on user's request

1.1.2.13 Delete parts of recordings

If possible, the format should allow this feature under the control of the STB. However, complex processing and knowledge on the service may be required for this functionality.

1.1.2.14 Inserting

If possible, the format may support insert editing. This feature will probably require very complex processing and deep understanding of the service. An implementation, which will allow this feature, may be of semi-professional nature.

1.2 System Model

This specification is based on the following overall system model:

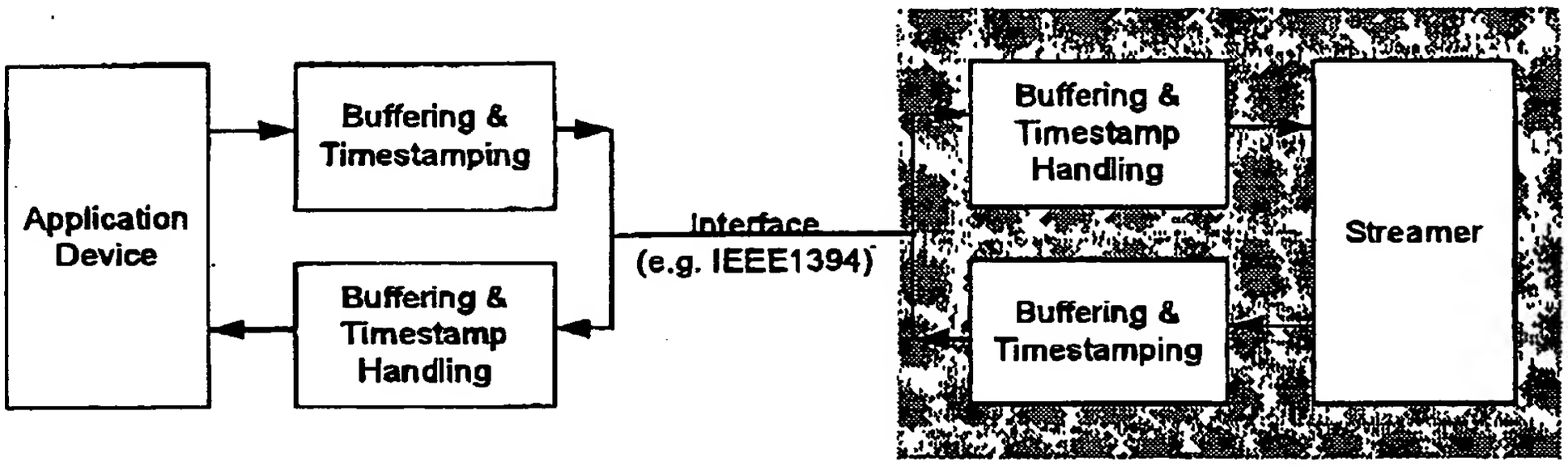


Figure 1-1 Overall System Model of DVD Stream Recording

<Stream Data & Navigation Data>

1.3 Directory and File Structure

The organization of Stream Data and Navigation Data of DVD Stream Recording is done in a specific way such as to take into account the following:

- Any DVD Streamer Device has certain requirements to store its own "housekeeping" data on the disc. These data are solely for helping the retrieval of recorded data; they need not be understood or even be visible to any outside Application Device.
- Any DVD Streamer Device needs to communicate with the Application Device it is connected to. This communication should be straightforward, and as universal as possible, so that the maximum possible range of applications - both today and future - can be connected to the Streamer. The Navigation Data to support such communication must be understandable by the Streamer as well as by the Application Device.
- The Streamer Device should offer to the connected Application Device a means for storing its own private data of any desired kind. The Streamer needs not to understand any of the content, internal structure, or meaning of this "Application Private Data".

Figure 1-2 illustrates the directory and files where all the data comprising the disc content according to this Specification are recorded. All the files storing the disc content are placed under the STRREC directory.

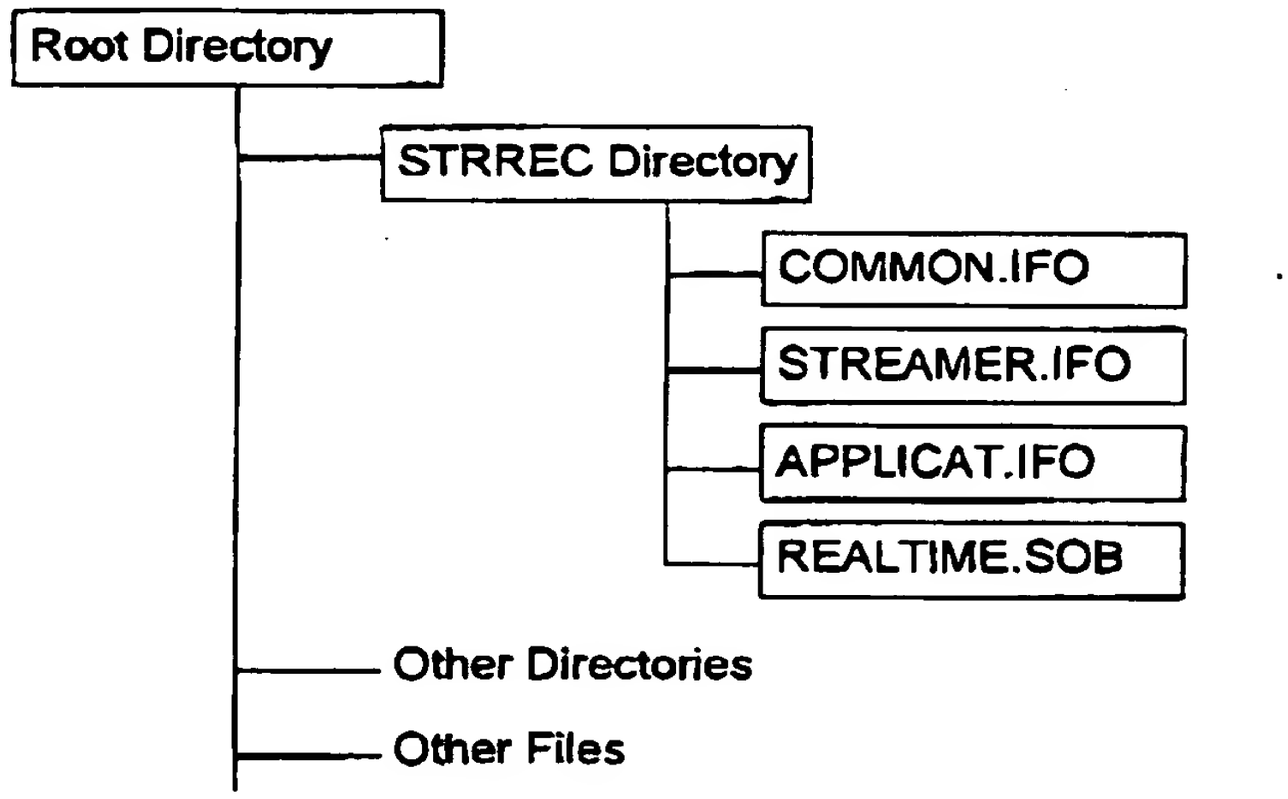


Figure 1-2 Directory and File Configuration

Under the STRREC directory, the following files are created:

- ***COMMON.IFO***

Basic information to describe the stream content. Needs to be understood by the Application Device as well as the Streamer.

- ***STREAMER.IFO***

Private housekeeping information specific to the Streamer Device. Needs not to be understood by the Application Device.

- ***APPLICAT.IFO***

Application Private Data, i.e. information that is specific to the Application(s) connected to the Streamer. Needs not to be understood by the Streamer.

- ***REALTIME.SOB***

Recorded real-time stream data proper.

Note that except for the files described above, the STRREC directory shall not contain any other files or directories.

2 Navigation Data Structure

Navigation data is provided to control the recording, playing back, and editing of any bitstreams that are recorded according to this Specification. As shown in Fig. 2-1, Navigation Data consists of Stream Management Information (SMI) as contained in the file named COMMON.IFO and of Housekeeping Information (HKPI) as contained in the file named STREAMER.IFO.
From the point of view of the Streamer Device, these two kinds of information are sufficient to perform all necessary operations. Their details are described in Section "2.1 Streamer Relevant Navigation Data" below.

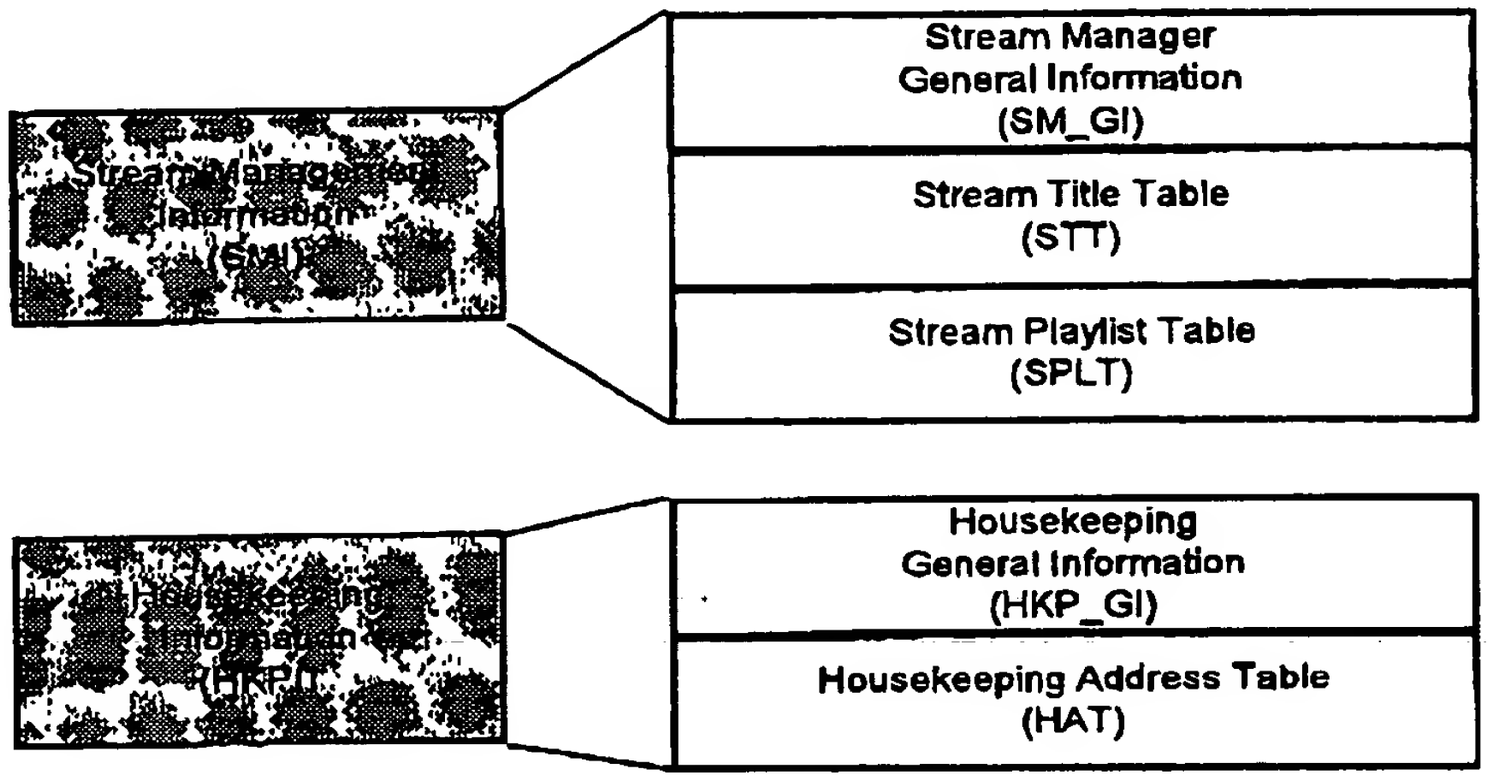


Figure 2-1 Structure of DVD Streamer Navigation Data

In addition to these, DVD Stream Recording also foresees the possibility of reserving a storage location for Application Private Data (APD), which may in general also be considered as Navigation Data. See Section "2.2 Application Private Data" for Details.

2.1 Streamer Relevant Navigation Data

As explained above, SMI and HKPI are the Navigation Data which are directly relevant for the Streamer operation.
SMI consists of three kinds of information tables, namely Stream Manager General Information (SM_GI), Stream Title Table (STT), and Stream Playlist Table (SPLT). These three tables shall all mandatorily be recorded and stored in the COMMON.IFO file in this order.
HKPI consists of two kinds of information tables, namely Housekeeping General Information (HKP_GI) and Housekeeping Address Table (HAT). Both shall mandatorily be recorded and stored in the STREAMER.IFO file in this order.

NB: Unlike in the "DVD Specification for Read-Only Disc Part 3 VIDEO SPECIFICATION", where each table within Navigation Information shall be aligned on a sector boundary, there is no such restriction in Stream Recording.

2.1.1 Stream Manager General Information (SM_GI)

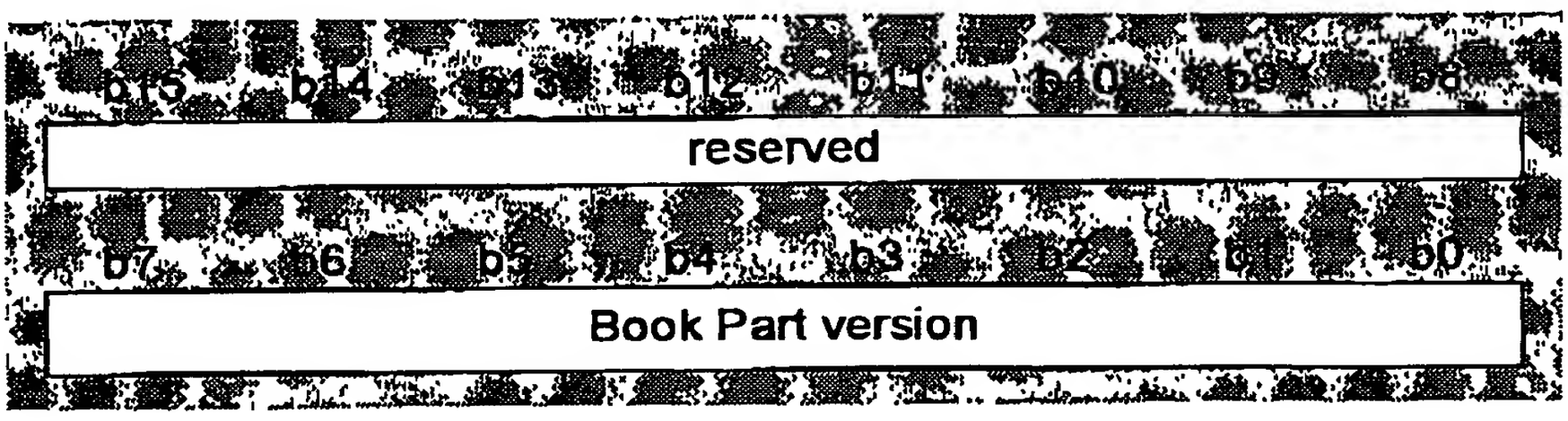
RBP		Contents	Number of Bytes
0 to 9	STRMG_ID	STRMG_Identifier	10
10 to 11	reserved	reserved	2
12 to 15	SMI_EA	End address of SMI	4
16 to 27	reserved	reserved	12
28 to 31	SMGI_EA	End address of SM_GI	4
32 to 33	VERN	Version number of DVD Streamer Specifications	2
34 to 127	reserved	reserved	94
128 to 129	TM_ZONE	Time Zone	2
130 to 191	reserved	reserved	62
192 to 195	STT_SA	Start Address of STT	4
196 to 199	SPLT_SA	Start Address of SPLT	4
200 to 511	reserved	reserved	312
		Total	**512**

(RBP 0 to 9) STRMG_ID
Describes "DVD_STR_MG" to identify Stream Recording Management Information File with character set code of ISO646 (a-characters).

(RBP 12 to 15) SMI_EA
Describes the end address of SMI with RLBN from the first LB of this SMI.

(RBP 28 to 31) SMGI_EA
Describes the end address of SM_GI with RBN from the first byte of this SM_GI.

(RBP 32 to 33) VERN
Describes the version number of this Specification.



Book Part version ...	0000b 0001b:	version 0.1
	Others:	reserved

(RBP 128 to 129) TM_ZONE
Describes the Time Zone for this Disc. All fields related to "Recorded Time" share this Time Zone value. The detailed structure for TM_ZONE is TBD.

(RBP 192 to 195) STT_SA
Describes the start address of STT with RBN from the first byte of this SM_GI.

(RBP 196 to 199) SPLT_SA
Describes the start address of SPLT with RBN from the first byte of this SM_GI.

2.1.2 Stream Title Table (STT)

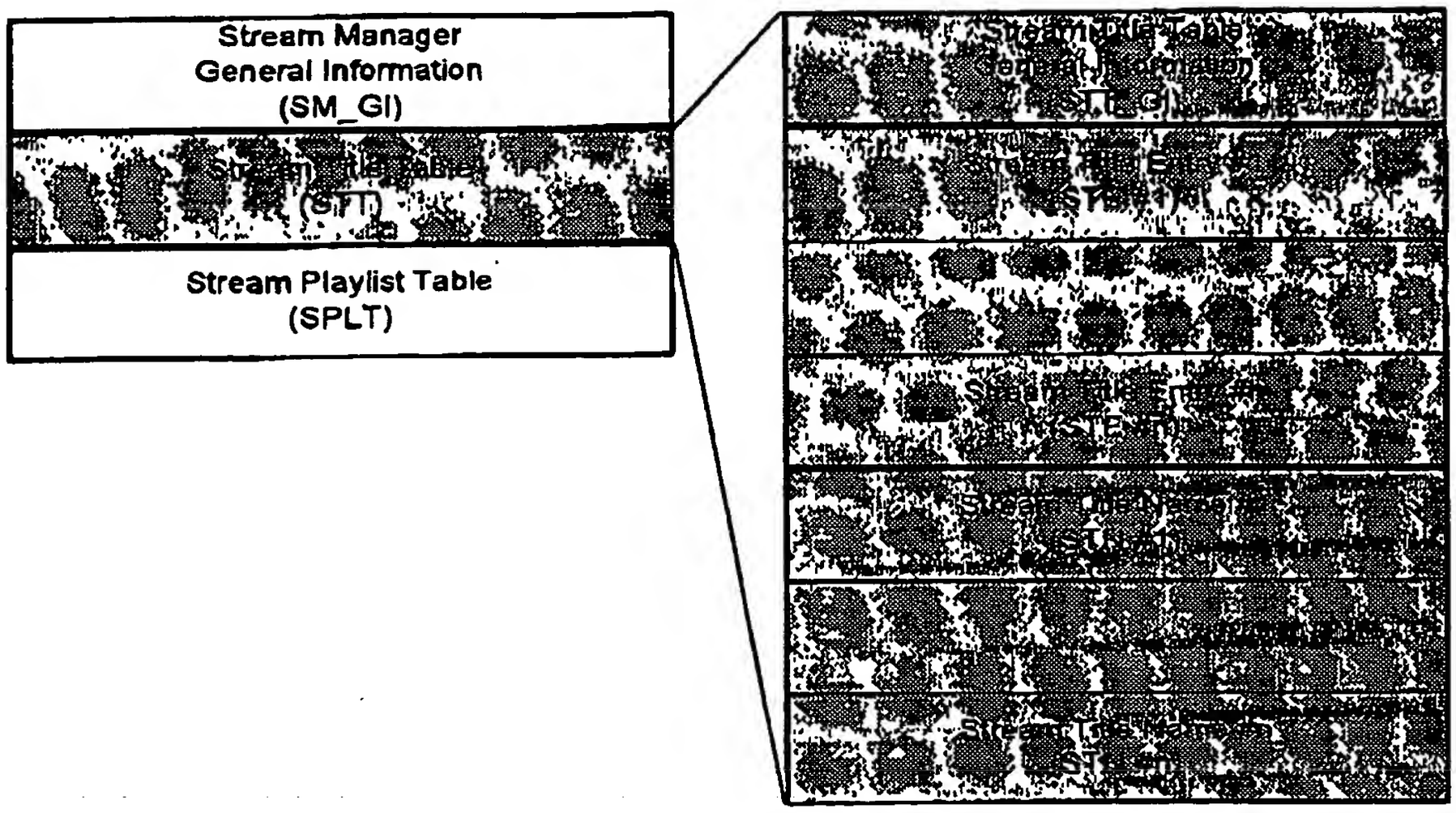


Figure 2-2 : Stream Title Table

2.1.2.1 Stream Title Table General Information (STT_GI)

	Contents	Number of Bytes
(1) ST_Ns	Number of Stream Titles	2
(2) STT_EA	End Address of Stream Title Table	4
(3) STN_CHRS	Stream Title Name Character Set	1
	Total	7

(1) ST_Ns
Describes the number of Stream Titles, which are described in this STT. The maximum allowable number of Stream Titles is 999.

(2) STT_EA
Describes the End Address of Stream Title Table with RBN from the first byte of the STT.

(1) STN_CHRS
Identifies the character set used for the Stream Title Names (STNs) in this STT. Details are TBD.

2.1.2.2 Stream Title Entry (STE)

	Contents	Number of Bytes
(1) AP_PKT_SZ	Application Packet Size	2
(2) SRV_ID	Service ID	1
(3) AP_DEV_ID	Application Device ID	12
(4) ST_DUR	Stream Duration	6
(5) ST_NM_SRP	Stream Name Search Pointer	4
	Total	25

(1) AP_PKT_SZ
Describes the Application Packet Size in bytes. This packet size is valid for the entire stream title.
NB: Due to the minimum transfer rate restriction rules described in Section „??", knowledge of the AP_PKT_SZ does not automatically and not for all streamer packets imply how many application packets are grouped together into the streamer packet.

(2) SRV_ID
Describes an identifier of the digital service which created the stream of this title. Details of the identifier are TBD.

(3) AP_DEV_ID
Describes an identifier of the application device that was physically delivering the stream of this title. Details of the identifier are TBD.

(4) ST_DUR
Describes the duration of the stream of this title, as resulting from the difference between the extended SCR of the last application packet of the stream minus the extended SCR of the first application packet of the stream. For the definition of Extended SCR, see Section „??".

(5) ST_NM_SRP
Describes the start address of the name string associated with this stream title, with RBN from the first byte of the STT. Name sharing shall not occur, i.e. each of the ST_NM_SRPs of the stream titles shall point to a different stream title name.

2.1.2.3 Stream Title Name (STN)

	Contents	Number of Bytes
(1) ST_NAME	Stream Title Name	variable

(1) ST_NAME
Describes the Stream Title Name as a variable length string of characters from the character set identified by STN_CHRS of STT_GI.

2.1.3 Stream Playlist Table (SPLT)

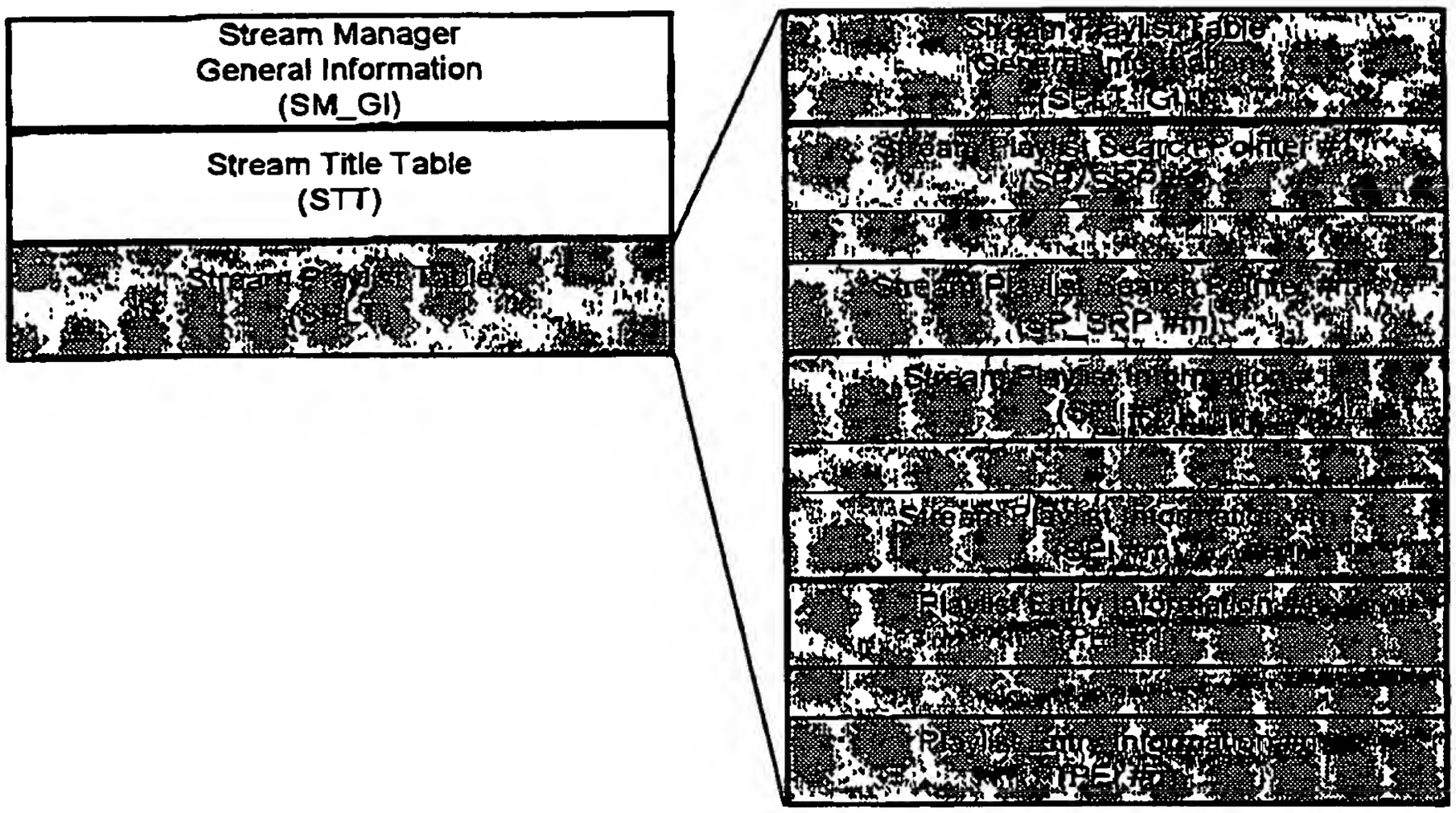


Figure 2-3 : Stream Playlist Table

2.1.3.1 Stream Playlist Table General Information (SPLT_GI)

	Contents	Number of Bytes
(1) SPL_Ns	Number of Playlists	1
(2) SPLT_EA	End address of SPLT	4
(3) SPLN_CHRS	Stream Playlist Name Character Set	1
	Total	6

(1) SPL_Ns
Describes the Number of playlists described in this SPLT. The maximum allowed number of playlists is 99. SPL_Ns also informs, how many SPI_SA and associated SPI are included in this SPLT.

(2) SPLT_EA
Describes the End Address of this SPLT with RBN from the first byte of this SPLT.

(3) SPLN_CHRS
Identifies the character set used for the Stream Playlist Names (SPLNs) in this SPLT. Details are TBD.

2.1.3.2 Stream Playlist Search Pointer (SP_SRP)

	Contents	Number of Bytes
(1) SPI_SA	Start Address of Playlist Information	4

(1) SPI_SA
Describes the Start Address of the corresponding Stream Playlist Information, with RBN from the first byte of this SPLT.

2.1.3.3 Stream Playlist Information (SPI)

	Contents	Number of Bytes
(1) PE_Ns	Number of Playlist Entries	2
(2) SPL_CREATE_TM	Creation Time of this SPL	5
(3) SPL_NAME	Stream Playlist Name	variable

(1) PE_Ns
Describes the Number of playlist entries of which this playlist consists. The maximum allowed number of playlist entries per playlist is TBD. PE_Ns also informs, which and how many of the subsequent PEs belong to this playlist.

(2) SPL_CREATE_TM
Describes the creation time of this playlist in STRR's Date and Time Describing format TBD.

(3) SPL_NAME
Describes the Stream Playlist Name as a variable length string of characters from the character set identified by SPLN_CHRS of SPLT_GI.

2.1.3.4 Playlist Entry Information

	Contents	Number of Bytes
(1) PE_ST_N	Index of Stream Title	2
(2) PE_S_SCR	Start SCR	6
(3) PE_E_SCR	End SCR	6
	Total	14

(1) PE_ST_N
Describes the index of the Stream Title to be played back for this PE.

(2) PE_S_SCR
Describes the Extended SCR value of the first application packet to be played back.

(3) PE_E_SCR
Describes the Extended SCR value of the last application packet to be played back.

2.1.4 Housekeeping General Information (HKP_GI)

	Contents	Number of Bytes
(1) HAE_Ns	Number of Housekeeping Address Entries	2
(2) HKPI_EA	End address of HKPI	4
(3) HKP_TSCAL	Time Scale Factor	1
	Total	7

(1) HAE_Ns
Describes the number of housekeeping address entries countained in this HKPI. The maximum allowed number of housekeeping adress entries is TBD.

(2) HKPI_EA
Describes the End Address of this HKPI with RBN from the first byte of this HKPI.

(2) HKP_TSCAL
Describes the time scaling used within this HKPI. Details of time scaling are TBD.

2.1.5 Housekeeping Address Table (HAT)

The purpose of this table is to provide all necessary information so that given playlist entries are efficiently translated into disc address pairs (from-to). ~~Details of HAT are TBD.~~

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HANNOVER

Date	Sep 4, 1998
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Name	Harald SCHILLER

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ADDENDUM ON "DVD STREAM RECORDING SPECIFICATION (DRAFT) VER 0.1" RE: THE HOUSEKEEPING ADDRESS TABLE

"Housekeeping" in general context of either RTRW or Stream recording is the task to translate a given time value (presentation time in case of RTRW, or packet arrival time in case of Stream recording) into a disc address value, where the desired data can be found.

Presentation data in DVD forum's AH1-5's "RTRW Specification" is organized into units called "VOBU". VOBUs are variable size (data amount measured in number of sectors), but are also variable duration (measured in number of video fields). For data retrieval, i.e. for RTRW's housekeeping, RTRW foresees a "VOBU map", which is a table where for every VOBU in a recording, the length in sectors, and the duration in fields is entered. by storing these "deltas", and not the total length or total duration, these entries can be described with smaller wordlength, which helps to keep the total VOBU map in reasonable size.

In Stream recording, bitstreams have no meaning, and we are free to subdivide them into sub-units of more regular structure. basically, a table for data retrieval can be based on two principles:

- bitstream data can be subdivided into pieces of constant "duration"

or

- bitstream data can be subdivided into pieces of constant "length"

in case of bitstream data subdivided into pieces of constant duration, duration is the difference between the arrival time of the last packet and the arrival time of the first packet of the piece. Then the "housekeeping address table" (HAT) contains a size or offset or delta size (in general, an address-like quantity) for each of these constant-duration pieces. The housekeeping process then consists of the following steps:

- By division and truncation, calculate from the given time value the index of the table entry to look up.
- The content of the table entry either directly specifies the address value to access, or all table entries up to that index have to be accumulated to get the address value to access.

The big disadvantage of a HAT based on constant duration pieces is the following fact:

- In case of a low bitrate recording, the pieces of constant duration will be small in size (number of sectors). The disc can contain enormous numbers of those pieces, so that the HAT may become unrealistically big (toobig to be kept in memory).

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		Name	Harald SCHILLER

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- In case of high bitrate recording, the pieces of constant duration are big in size (number of sectors). Then, addressing one piece or another corresponds to a very coarse addressing on the [sector] scale, i.e. a piece address derived from the housekeeping can be many sectors "off" from the desired location.

In summary, housekeeping based on constant-duration pieces can result in a too big HAT in some cases, and can result in too coarse addressing in other cases.

The other alternative of housekeeping is to base it on pieces of constant size. This is our invention and the method that we propose in Stream recording. In a medium like DVD-RAM, where data are physically organized into "ECC blocks" of 32kByte length, additional advantages result, if this size or a multiple of it is used as the piece size, but in principle, any constant size can be used.

The HAT then contains, for each of these pieces of constant size, an absoulte duration or (preferrably) a delta duration which indicates the arrival time difference between the last and first packet contained in this piece.

The housekeeping process then consists of the following steps:

- Accumulate the delta durations contained inthe HAT, until the given time value is most closely reached "from beneath" (i.e. until the sum is smaller or equal to the given time value for the last time).
- The index of this table entry, multiplied by the piece size constant, directly gives the address value to access.

The advantage of a constantsize-based HAT is that

- HAT size does not depend on bitrate of the recordings.
- HAT addressing accuracy is constant, the granularity basically corresponds to the "piece size constant", which can be chosen constant per disc, "forever", or per recording, as appropriate.

2.2 Application Private Data

APD, if it exists, consists of three kinds of information, namely Application Private Data General Information (APD_GI), a set of one or more Application Private Data Search Pointer (APD_SRP), and a set of one or more Application Private Data Area (APDA). If any Application Private Data exists, these three kinds of information shall all mandatorily be recorded and stored in the APPLICAT.IFO file in this order.

NB: Unlike in the "DVD Specification for Read-Only Disc Part 3 VIDEO SPECIFICATION", where each table within Navigation Information shall be aligned on a sector boundary, there is no such restriction in Stream Recording.

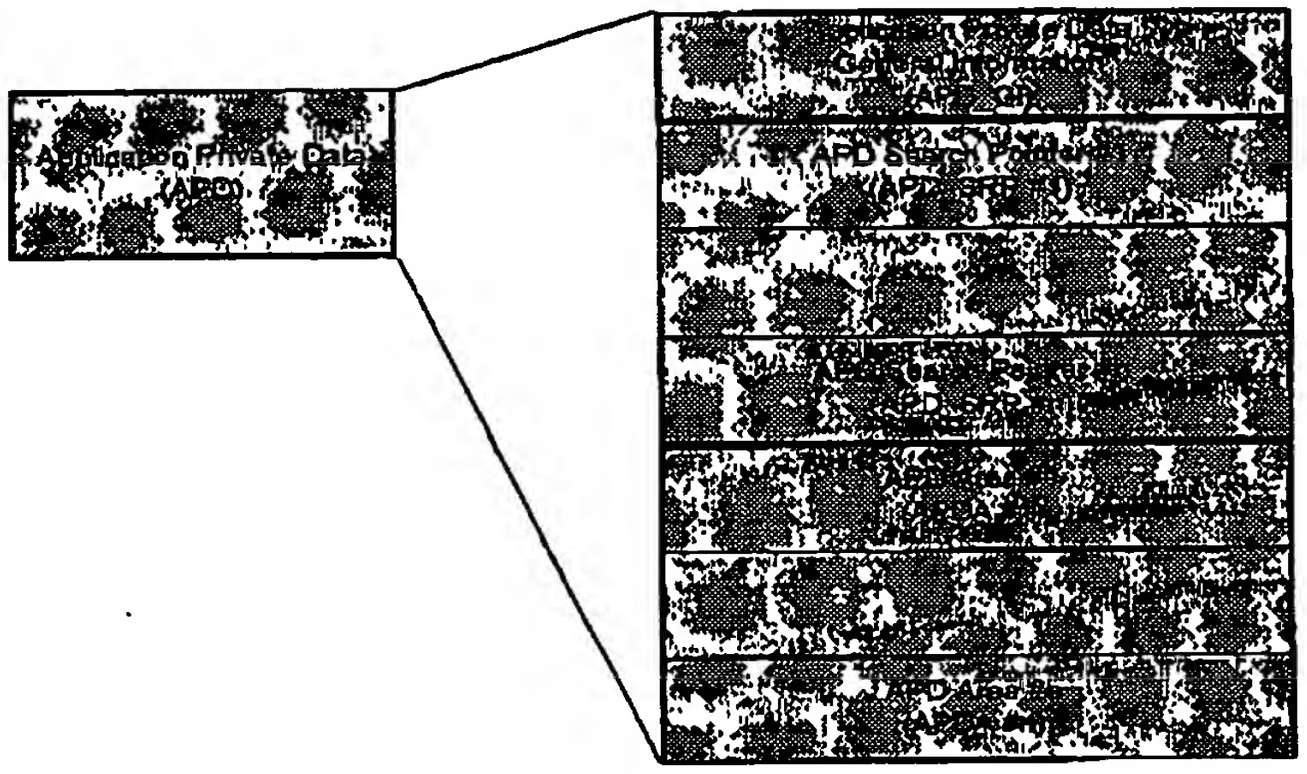

Figure 2-2 Application Private Data

2.2.1 Application Private Data General Information

	Contents	Number of Bytes
(1) APDA_Ns	Number of Application Private Data Areas	1
(2) APD_EA	End Address of Application Private Data	4
(3) APDA_SRV_ID	APD Area Service ID	APDA_Ns x 4

(1) APDA_Ns
Describes the number of Application Private Data Areas, into which this APD is organized.

(2) APD_EA
Describes the end address of APD with RBN from the first byte of the APD.

(3) APDA_SRV_ID
Describes a Service ID for each of the Application Private Data Areas to follow. For details of Service ID, see Annex A.

2.2.2 Application Private Data Search Pointer

	Contents	Number of Bytes
(1) APDA_SA	Start address of APDA	4

(1) APDA_SA

Describes the start address of APDA with RBN from the first byte of APD.

2.2.3 Application Private Data Area

	Contents	Number of Bytes
(1) APDA	Application Private Data Area	Variable

(1) APDA
Describes the Application Private Data.

3 Stream Data Format

Stream Data according to this Specification consists of one or more „Stream Objects" (SOBs) which are each stored as a „Program stream" as described in [MPEG-2 Systems]. A SOB has the following restrictions:

1. Each SOB shall be terminated by a program_end_code.
2. The value of the SCR field in the first pack of each SOB may be non-zero.

A SOB contains the Stream Data packed into a sequence of „Stream Packs" (S_PCKs).

The transfer rate of SOBs shall obey the restrictions listed in Table 3-1.

Table 3-1 : Restrictions on transfer rate of Stream Data

Minimum Transfer rate	TBD
Maximum Transfer Rate	TBD

Stream Data described under this Specification are organized as one elementary stream and are carried in PES packets with a stream_id of of private_stream_1. In some other formats of the DVD family, private_stream_1 is also used to carry several kind of non-MPEG AV Presentation Data. As a means of distinction among these, the first byte of the data area of each packet is used as „sub_stream_id". DVD Stream Recording, although already separated by the use of a different directory for its data, shares this principle, i.e. the first byte of data area is used as a sub_stream_id and is entered as a new, unique value of TBD designating the subsequent payload as „Stream Recording Data".

3.1 Stream Object

A stream Object is composed of one or more Stream Packs (S_PCKs) as shown in Fig 3-1

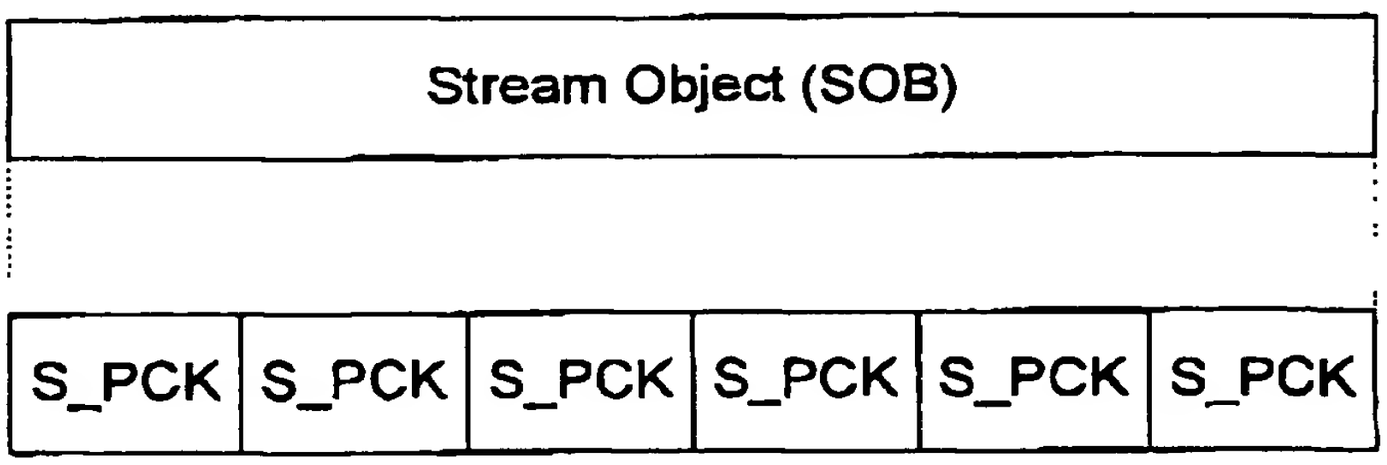

Figure 3-1 : Structure of a Stream Object

Because the length of a SOB is basically arbitrary, the last S_PCK of a SOB might employ padding in one of two different ways. For details see Section ??.

3.2 Stream Pack

Stream Packs are „Program Stream Packs" in the sense of [MPEG2 System] and comply with all rules given there. The pack length is 2048 bytes (one LB) and a pack is recorded in one LB.

A Stream Pack consists of one pack header, followed by zero or one system header, and followed by one Stream Packet (S_PKT). An extra padding packet will not be employed, as shown in Figure 3-2.

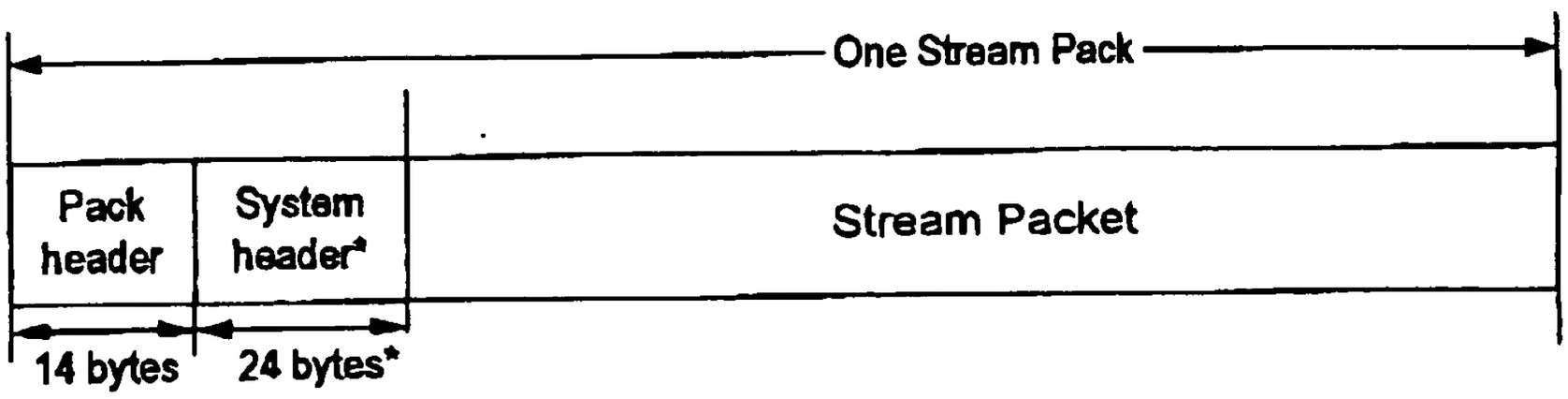

Figure 3-2 : Structure of a Stream Pack

A system header is included exactly in those S_PCKs, which are the first S_PCK of a SOB. When a system header is included, the length of the remaining Stream Pack content is 2010 bytes, when it is not included, the length of Stream Pack content is 2034 bytes.

In Stream recording, the application performs its own padding, so that the pack length adjustment methods of DVD-ROM Video or RTRW need not to be used. In Stream recording it is safe to assume, that the Stream packets will always have the necessary length.

3.2.1 Pack Header

Table 3-3 : Pack header

Field	Number of bits	Number of bytes	Value	Comment
pack_start_code	32	4	0000 01BAh	
'01'	2	6	provider defined	01b
SCR_base[32..30]	3			(Note 1)
marker_bit	1			1
SCR_base[29..15]	15			
marker_bit	1			1
SCR_base[14..0]	15			
marker_bit	1			1
SCR_extension	9			
marker_bit	1			1
program_mux_rate	22	3	01 3883h	mux_rate = 8Mbps (Note 2)
marker_bit	1			1
marker_bit	1			1
reserved	5	1	F8h	11111b
pack_stuffing_length	3			no stuffing length = 000b

Note 1: „SCR_base[32]" shall be set to ZERO.
Note 2: „program_mux_rate" shall be set to 8Mbps.

3.2.2 System Header

Table 3-4 : System header

Field	Number of bits	Number of bytes	Value	Comment
system_header_start_code	32	4	0000 01BBh	
header length	16	2		
marker_bit	1	3	809C41h	1
rate_bound	22			mux_rate = 8Mbps
marker_bit	1			1
audio_bound	6	2	0	No audio streams
fixed_flag	1		0	Variable bit rate
CSPS_flag	1		1 or 0	
system_audio_lock_flag	1		1	
system_video_lock_flag	1		1	1
marker_bit	1		1	1
video_bound	5		0	No video streams
packet_rate_restriction_flag	1	1	0 or 1	
reserved_bits	7		7Fh	
stream_id	8	1	~~??~~	~~??~~
'11'	2	2	11b	
P-STD_buf_bound_scale	1		1	buf_size x 1024 bytes
P-STD_buf_size_bound	13		232	buf_size = 237568 bytes
stream_id	8	1	~~??~~	~~??~~
'11'	2	2	11b	
P-STD_buf_bound_scale	1		0	buf_size x 128 bytes
P-STD_buf_size_bound	13		32	buf_size = 4096 bytes
stream_id	8	1	1011 1101b	private_stream_1
'11'	2	2	11b	
P-STD_buf_bound_scale	1		1	buf_size x 1024 bytes
P-STD_buf_size_bound	13		58	buf_size = 55392 bytes
stream_id	8	1	1011 1111b	private_stream_2
'11'	2	2	11b	
P-STD_buf_bound_scale	1		1	buf_size x 1024 bytes
P-STD_buf_size_bound	13		2	buf_size = 2048 bytes

3.3 Stream Packet

In Stream Packets, no stuffing takes place and each Stream packet has just DTS, no PTS. Packet header size therefore is 14 bytes constant.

3.3.1 Packet Header

Field	Number of bits	Number of bytes	Value	Comment
packet_start_code_prefix	24	3	00 0001h	
stream_id	8	1	1011 1101b	private_stream_1
PES_packet_length	16	2		
'10'	2	3	10b	
PES_scrambling_control	2			TBD
PES_priority	1		0	no priority
data_alignment_indicator	1		0	not defined by descriptor
copyright	1		0	not defined by descriptor
original_or_copy	1		0	copy
PTS_DTS_flags	2		10b	
ESCR_flag	1		0	no ESCR field
ES_rate_flag	1		0	no ES rate field
DSM_trick_mode_flag	1		0	no trick mode field
additional_copy_info_flag	1		0	no copy info field
PES_CRC_flag	1		0	no CRC field
PES_extension_flag	1		0	no extension
PES_header_data_length	8		5	
'0001'	4	5	Provider defined	
DTS[32..30]	3			
marker_bit	1			
DTS[29..15]	15			
marker_bit	1			
DTS[14..0]	15			
marker_bit	1			
stuffing byte	-	0 to 7		
Private data area				
sub_stream_id	8	1	TBD	
Stream data area				

3.3.2 Stream Data area

The Stream data area inside a Stream Packet consists of an application header, an application header extension, and a sequence of application packets, each prefixed by an application packet timestamp.

3.3.2.1 Application Header

Field	Number of bits	Number of bytes	Value	Comment
(1) MAX_BITRATE	32	4		
(2) SMOOTH_BUF_SIZ	16	2	3540 bytes	
(3) TS_REF_CL_FREQ	32	4	27 MHz	
(4) AP_PKT_LEN	16	2		
(5) TS_LEN	8	1	'4'	
(6) AP_PKT_Ns	8	1		
(7) START_OF_STR	1	1	0b or 1b	
(8) END_OF_STR	1		0b or 1b	
reserved	6			
	Total	15		

(1) MAX_BITRATE
Describes the output bitrate parameter of the leaky bucket flow control model in Mbps.

(2) SMOOTH_BUF_SIZ
Describes the buffer size parameter of the leaky bucket flow control model.

(3) TS_REF_CL_FREQ
Describes the reference clock frequency of the packet arrival/delivery timestamp.

(4) AP_PKT_LEN
Describes the length of the application packet.

(5) TS_LEN
Describes the length of the timestamp field.

(6) AP_PKT_Ns
The number of application packets in this DVD pack.

(7) START_OF_STR
When set to ´1´, this packet is the first DVD pack in the stream.

(8) END_OF_STR
When set to ´1´, this packet is the last DVD pack in the stream.

3.3.2.2 Application Header Extension

The application header extension consists of a list of entries, where there is exactly one entry for each transport layer packet. These bytes are used to store information that may differ from packet to packet.

The total length of the application header extension shall be 46 bytes. The first 'AP_PKT_Ns´ entries of these shall carry valid data. Unused list entries may carry undefined values.

The total length of 'application header' and 'application header extension' shall be 61 bytes.

Field	Number of bits	Number of bytes	Value	Comment
(1) AU_START	1			
(2) AU_END	1	1		
(3) reserved	4			
(4) COPYRIGHT	2			

(1) AU_START
When set to '1', indicates that the associated application packet contains a random access entry point into the stream

(2) AU_END
When set to '1', indicates the associated application packet is the last packet of a random access point.

(4) COPYRIGHT
Describes the copyright status of the associated application packet. ~~Details are TBD~~

3.3.2.3 Time Stamps

The data stream contains time stamps, e.g. within the data packets.

List of Abbreviations

LB.....Logical Block
RBN.....Relative Byte Number
RBP.....Relative Byte Position
RLBN.....Relative Logical Block Number

Claim

1. Method for addressing a bitstream to be recorded or being recorded on a storage medium, e.g. a DVD recorder, wherein an address table is used that is based on pieces of said bitstream including a constant amount of bits, to each of which pieces an absolute time duration or delta time duration is assigned in said address table.